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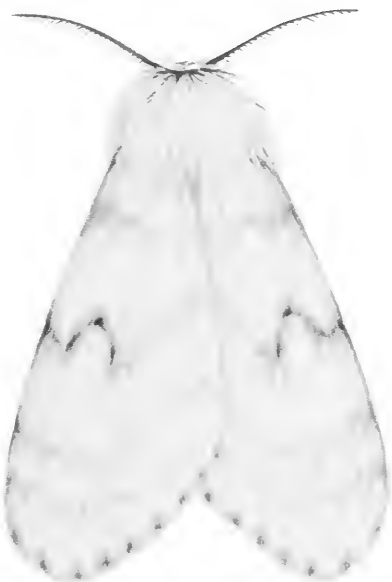
Gypsy Moth
Handbook

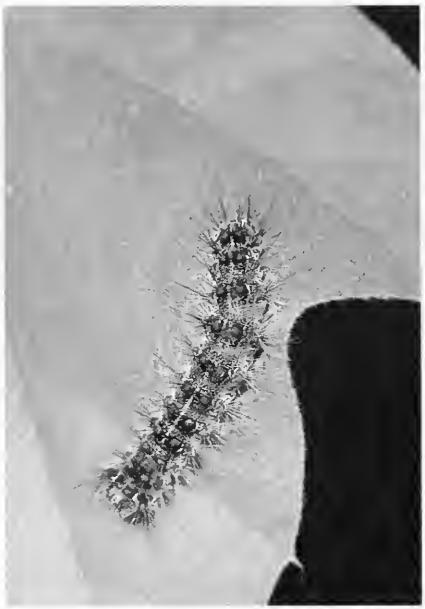
The Gypsy Moth: An Illustrated Biography



The Gypsy Moth: An Illustrated Biography

by Michael L. McManus[1] and Roger T. Zerillo[2]

In 1974 the U.S. Department of Agriculture initiated the Combined Forest Pest Research and Development Program, an interagency effort that concentrated on the Douglas-fir tussock moth in the West, on the southern pine beetle in the South, and on the gypsy moth in the Northeast. The work reported in this publication was funded in whole or in part by the program. This manual is one in a series on the gypsy moth.



The gypsy moth is probably the most important defoliating insect of hardwoods—especially oak—in the Northeastern United States (fig. 1). Much effort and money have been spent to control this pest, yet it continues to spread south through Pennsylvania and west to Ohio.

This booklet details the insect's life cycle and, through photographs, provides identification of each life stage, from egg to adult moth.

Figure 1.—Gypsy moth larva (caterpillar).

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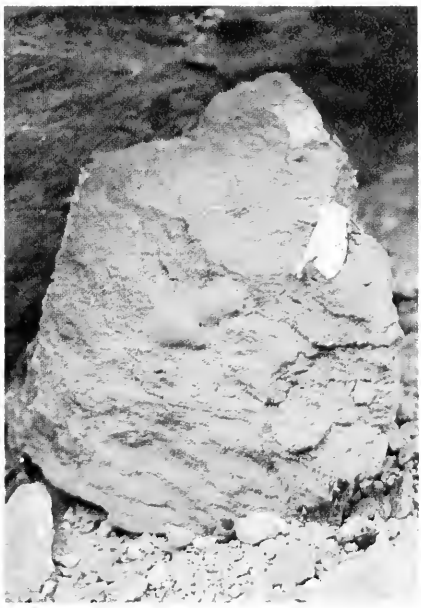

The female gypsy moth lays one egg mass in June or July and then dies shortly after. The eggs are deposited in a well-formed egg mass on trees as well as on rocks, stumps, ground foliage, houses, yard equipment, wood piles, stone walls, and camping trailers (figs. 2 and 3). The eggs do not hatch until the following spring.

Figure 2.—Many egg masses laid on the undersides of branches of an oak tree.

Figure 3.—Freshly deposited egg masses on a stone.

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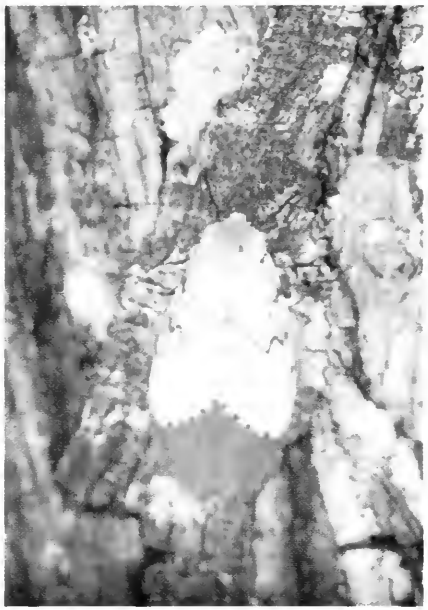

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Figure 4.—Female moth depositing egg mass.

Figure 5.—Weathered egg masses showing characteristic emergence holes of the egg parasite, *Ooencyrtus kuvanae*.

Figure 6.—Adult *O. kuvanae* resting on egg mass.

The egg masses are buff colored when first laid (fig. 4) but may bleach out over the winter months when exposed to direct sunlight and weathering (fig. 5). Small pinholes evident on egg masses are emergence holes of a parasite (fig. 6) that can destroy up to 40 percent of the eggs within a mass.

Egg masses contain from 75 to 1,000 eggs. Each egg is encased in a secretion produced by the female moth, along with scales and hairs from the underside of her body (fig. 7). The mixture provides the eggs excellent protection from desiccation and from winter temperatures as low as −20° F (−29° C).

In late April or early May, first-stage larvae (caterpillars) emerge from individual egg masses in 3 to 5 days. Egg hatching may continue over a period of 2 to 3 weeks in any one locality, depending on the placement of egg masses and exposure to sunlight. Newly hatched larvae are buff colored but turn black within 4 hours after hatching (fig. 8). They may rest on or around the egg mass for hours if temperatures are below 40° F (4° C). If it is raining, larvae may remain in this position for 24 to 48 hours.

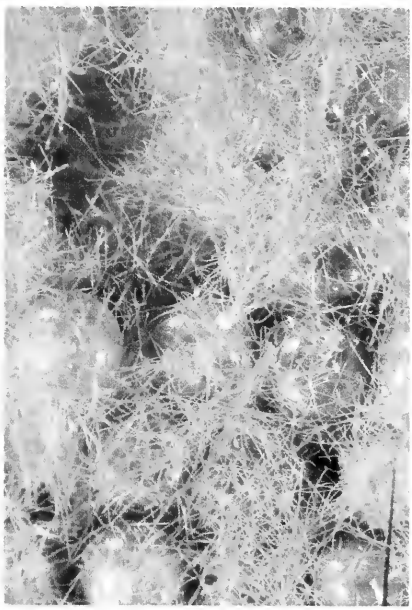

Figure 7.—Scales and hairs from the underside of female gypsy moth.

Figure 8.—Newly hatched larvae (buff colored) and older larvae on surface of egg mass.

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When conditions are favorable, larvae climb trees in response to light and trail silk continually as they move (fig. 9). When they reach the outer branches or tops of the trees, they drop on silken threads (fig. 10), reclimbing the strands until carried by the wind to a new location. Both the silk and long lateral hairs provide buoyancy to the windborne caterpillars (fig. 11).

Larvae begin feeding on acceptable host plants (of which there are many) and usually chew small holes within the perimeter of the leaf (fig. 12). In later stages, larvae usually feed on the leaf margins. There are two or three feeding periods during the day. First-stage larvae usually produce a mat of silk on the underside of the leaf where they rest when not feeding.

Figure 9.—Larvae trailing silk on foliage.

Figure 10.—Larva reclimbing silk after dropping from foliage.

Figure 11.—Newly hatched larva showing long hairs that aid dispersal.

Figure 12.—Leaf damage caused by feeding of early-stage gypsy moth larvae.

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Figure 13.—Third-stage larva.

Figure 14.—Newly emerged (molted) fourth-stage larva.

Figure 15.—Fifth-stage larva.

Male larvae molt (shed their outer skin) through five stages, females through six (figs. 13–15). The number of days spent in each stage varies from 4 to 10 days, depending on the stage and temperature. Second- and third-stage larvae characteristically stay in the tree crowns but may migrate to the undersides of branches and twigs.

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Figure 16.—Late-stage larvae beginning to aggregate on undersides of branches.

Figure 17.—Bark crevice and sign, ideal protective sites for late-stage larvae.

Figure 18.—Larvae resting in leaf litter at base of tree.

Figure 19.—White-footed mice feeding upon late-stage larvae.

When larvae molt to the fourth stage, their behavior changes dramatically. They feed during the night then descend the trees at dawn (fig. 16) in search of protective locations, where they rest for the remainder of the day. At dusk, larvae climb the trees again to feed. The movement up and down the tree is triggered by low light. Larvae prefer to rest under bark flaps or other structures on the tree (fig. 17). If none is present, the insects will descend to the ground and rest beneath leaf litter or other nearby objects (fig. 18), where they are susceptible to attack by small vertebrate predators such as mice and shrews (fig. 19).

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Larvae usually complete their development in late June or early July and begin to pupate (transform into the adult, or moth, stage), usually in the same location where they rested as fifth- or sixth-stage larvae. During this process the larvae attach themselves to the surface with strands of silk and eventually transform into mahogany-colored pupae (fig. 20). The pupae, which are immobile and defenseless, are vulnerable to predators such as the ground beetle (fig. 21) and parasites like the wasp in figure 22.

Figure 20.—Larvae attached by strands of silk beginning to transform into pupae similar to those on the left.

Figure 21.—Ground beetle (*Calosoma* sp.), predator of both larvae and pupae.

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Female pupae (fig. 23, right) are characteristically much larger than male pupae because they pass through an additional larval stage. The pupal stage of both sexes usually lasts about 2 weeks. Male moths usually emerge first because they pass through one less life stage and usually pupate earlier than the females.

Figure 22.—Adult parasite (*Brachymeria intermedia*) stinging and ovipositing an egg in gypsy moth pupa.

Figure 23.—Male (left) and female pupae.

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Figure 24.—Male moth.

Male moths (fig. 24) are strong fliers and are usually most active during the daytime within the forest canopy. They fly in zigzag patterns and can be seen searching up and down tree trunks for female moths. The female has well-developed wings but does not fly (fig. 25). She compensates for this by releasing a strong sex attractant that lures male moths from the surrounding area. Mating occurs and shortly thereafter the female deposits her egg mass.

If you spot a gypsy moth infestation in your area, contact one of the following for information about control:

- County extension agent
- State forestry organization
- State agriculture department
- Forest service or Animal and Plant Health Inspection Service, U.S. Department of Agriculture.

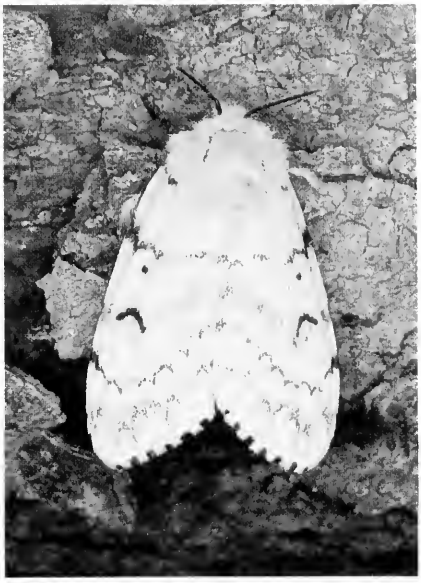

Figure 25.—Female moth.

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